

Non-linear Ultrasonic Bond-Strength Monitor, Phase I

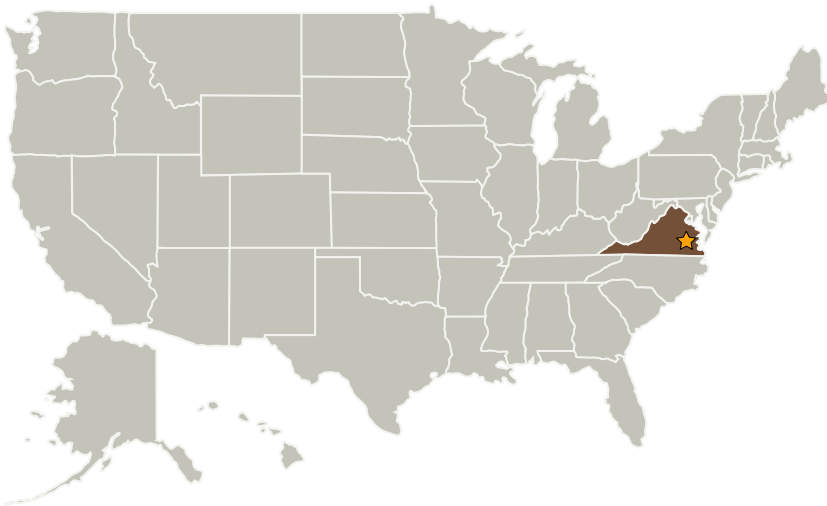
Completed Technology Project (2004 - 2005)



Project Introduction

To date, bond strength is considered one of the "holy grails" for NDE. Preliminary data indicates that the Luna Nonlinear Ultrasonic Bond Strength (NUBS) monitor will permit a nondestructive evaluation of bond strength for many classes of adhesives and bond configurations. The technology is based on high-resolution ultrasonic measurements that extract nonlinear parameters of the elastic bond properties. Working with Professor David Dillard, a recognized international expert in adhesion science at Virginia Tech., the Luna team will validate the NUBS concept using butt-joints and shear-lap joints with a family of adhesives and surface preparations. The tests will help Luna optimize the device electronic design while determining the range of use for quantitative assessments. The result of this R&D if carried to the Phase II will be a cost-effective field instrument that has wide applicability for one-sided bond assessment testing. This is especially critical for NASA as aerospace structures rely more and more on adhesives for beneficial design characteristics.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Luna Innovations, Inc.	Supporting Organization	Industry	Roanoke, Virginia



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Joseph S Heyman

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.2 Test and Qualification
 - └ TX13.2.3 Non-Destructive Inspection, Evaluation, and Root Cause Analysis